

“Wildlife Poaching: The Genetic Effect”

By Chinenye Princess Urama

“We’re in the process of bringing about the extinction of all of the species we most care about — including our own.”

– Alex Miller, Environmental Scientist

From the era of hunting and gathering, humans have always hunted animals for various reasons, mostly for food, and sometimes for their skin to make clothing and shelter. But as the world developed into the modern societies we live in today, hunting of these animals gradually became a thing of the past; however, the lives of most animals like the elephants, rhinos, pangolins, tigers, sea turtles, lemurs, a whole list of them, are endangered and estimated to be extinct in the next couple of years, not by the present pandemic affecting the lives of many, but by a practice that has been deemed illegal: poaching. Wildlife poaching, a source of extinction, affects the genetic variability of animals by disrupting their reproductive abilities and social relationships. As products of life itself, we are entitled to enjoy it without fear of getting killed for selfish reasons such as food, ivory, etc., and so should the animals. This can be achieved by using spatial analysis to identify patterns of poaching and set into motion responses or laws that would checkmate the activities of the poachers.

Poaching, according to the Oxford Learner’s Dictionary, is the illegal hunting of animals on someone else’s property with or without permission. According to Ridgwell (2020), in Edwardian England, right before the first World War, poaching of wildlife was the primary form of crime in the rural areas, and, despite the speculation that poaching was dominated by men, some Victorian women were also participants in this illegal activity (p. 35-6). Wildlife poaching

survived the World Wars, but the population of wild African elephants declined from 1.3 million to 600,000 not so long after, and in the span of a decade, 1970-1980 (Archie and Chiyo, 2012, p. 766). Animals are usually poached for various reasons, but, according to Mmahi and Usman (2019), they are poached for “household consumption, commercial gain, recreational satisfaction, trophy poaching, thrill killing, protection of property, poaching as rebellion, poaching as traditional right, disagreement with specific regulations and gamesmanship” (p. 1511). Regarding commercial gain, poachers poach in order to generate money, i.e. as a form of livelihood. Some people do this by selling ivory (ivory poaching), which involves killing the animal in order to come into possession with a particular part of their body, commonly horns, teeth, or skin, which can be illegally traded for large amounts of money depending on their value. Despite the International Ivory Trade Ban of 1989, which was clearly against hunting and killing of animals for trading purposes, ivory poaching is still one of the primary sources of poaching. There is also trophy poaching or “thrill killing,” which is killing for the sole purpose of entertainment and hanging the animal’s body, mostly the head, on the wall, or taking pictures for keepsake.

In addition, poaching can also be tied to cultural heritage or traditional rights, and practiced as act of rebellion against poaching laws. Animals are also poached because they are believed to damage property, farmland, etc., especially the land of those living in the rural areas and closer to the habitat of these animals. Most people’s sources of income depend on these farmlands, and when destroyed, people are more likely to kill these animals to forestall such occurrences. These underlying reasons for poaching, both good and bad, are sources of extinction in these animals, which cause genetic variability.

Poaching disrupts the reproduction abilities of animals and can lead to reproductive skew in males which happens when most females show a preference for a single male in the population or when a single male can monopolize the majority of receptive females (i.e., females that are ready to mate), which often occurs, especially in elephants. Yet, understanding the reproduction ability of animals is vital in understanding its effect when poaching is introduced. According to Archie and Chiyo (2012), “breeding behavior has a large effect on the structure of genetic diversity in animal populations...a few dominant males sire the majority of the offspring in the same social group, hence, over time, genetic relatedness and genetic differentiation within social groups increases” (p. 770). In male elephants specifically, older males, larger males, and males in musth are the ones that dominate the group. Musth is a physiological condition where the males are categorized by aggressive and unpredictable behavior and with an increase in reproductive hormones. Musth increases with age, meaning that the older the elephant gets, the longer they stay in musth. “In Samburu, most offspring were sired by males in musth and in both Samburu and Tarangenie, the oldest male sired the offspring” (Archie and Chiyo, 2012, p. 771). In elephants, musth and age determine reproductive success.

Poaching usually targets the older animals in the population, and therefore “poaching removes older animals from the population” (Archie and Chiyo, 2012, 769). As a result of this, poaching alters the pattern of paternity in elephant populations by increasing reproductive opportunities for the young males because the older ones are gone. But what happens when these older males are reintroduced into the population? There is bound to be competition for the females because they gestate for 22 months, and nurse the calves for 2-3 years, leaving them sexually receptive for 3-6 years, which is small in relation to the increased older male population

who are almost always in musth. Surprisingly, competition is not what ensues, but reduction in reproduction ability.

According to Archie and Chiyo (2012), “Genetic analyses confirm that poaching reduces the age of peak reproduction in males” (p. 772). This suggests that poaching increases reproductive opportunities for younger males and reduces reproductive skew, but further research and paternity analyses say otherwise. Studies find that poaching, instead, leads to higher reproductive skew among the males. However, if poaching increases reproductive skew, it could lead to a decrease in genetic diversity by reducing the number of breeding males, which will reduce the size of the population and increase the rate at which genetic diversity is lost. Genetic diversity is the total number of genetic characteristics in the genetic makeup of a species.

In addition to disrupting reproduction abilities, poaching affects the social relationship or interaction between the animals. For elephants, the males do not stay in groups like the females do; instead, they migrate from one group to another searching for mates while the females are more likely to stay in their various bonds or core group. A core group consists of a “fundamental unit of female relationships and are composed of 2-20 matrilineal adult females and their immature offspring.” After some days, weeks or months, these core groups break up to only a single adult female, and if the rest of the group joins another core group, it becomes a bond group (Archie and Chiyo, 2012, p. 768). These bond groups consist of varied ages, ranging from adults to infants, and the older females are extremely important because they form the outer barrier with the infants and younger ones inside; they also serve as sources of knowledge because they have been alive the longest. Poaching, which primarily targets the older ones in the population, disrupts kin-based relationships, killing off their relatives and leaving them to look for another social group to form or join, and “kinship is a strong predictor of an elephant’s social

relationship” (Archie and Chiyo, 2012, p. 768). As a result, they are left to join another social group, increasing genetic diversity among themselves.

Poaching the older ones also reduces the adaptive value of social relationships. Adaptive value refers to the extent that a trait, characteristic, etc., affects the evolutionary fitness of an individual or population. When the older animals in the group are poached, the elephants usually respond flexibly by joining new bond groups. In Amboseli, female elephants lose their close relatives to either natural causes or poaching; five of forty females in Amboseli lacked close maternal kin, but they did not seem to be majorly affected. They were also likely to be in close relationship with those from non-kin groups and get involved in other groups in their new group. Their bodies were also significantly better than those that stayed alone (Archie and Chiyo, 2012, p. 769-770). This shows flexibility and resilience, the ability to overcome obstacles, among elephants. That being said, despite their resilience and tendency to join other groups, that does not guarantee the actual possibility of joining new groups, or that the benefits of joining these new groups would be similar to benefits gained in groups where they had close or closer relatives. According to Archie and Chiyo (2012), research carried out in Mikumi demonstrated the behavioral and fitness-related consequences of poaching. After heavy poaching in Mikumi, 30% of 102 core groups were made up of single females, suggesting that quite a number of females failed to form new social relationships (p. 770).

Additionally, when the females joined new groups with non-relatives, they had fewer beneficial interactions with each other and other social groups. The disrupted groups also had “lower pairwise genetic relatedness, were less discriminating in their relationships with other core groups, and their interactions were more competitive than those with intact core groups [made up of relatives]” (Archie and Chiyo, 2012, p. 770). More research on the topic concluded

that female elephants from disrupted groups had weaker social bonds, higher stress levels, lower genetic relatedness, and significantly lower reproductive output than the females that were in groups containing kin or close relatives (Archie and Chiyo, 2012, p.770).

However, given all the studies identifying the negative impact of poaching, some people are still not convinced of its negativity and still consider it as a cultural heritage. An recent interview with a group of poachers in Nigeria contained the following remark: “The hunters do not perceive illegal hunting in Kainji National Park as an offense, but as a cultural heritage” (Mmahi and Usman, 2019, 1515). They believe that this is a job that runs in their blood, in their family, and hence see no reason to abandon it. “This is our hometown. Our forefathers hunted in this place called park, and we inherited it from them. Why should the government now impose restriction to force us to stop hunting. To us, it is not acceptable. Can you go to somebody’s home and dictate to him what to do and what not to do? It is unacceptable” (Mmahi and Usman, 2019, p. 1515). It was also mentioned that the government in response to banning illegal hunting of animals have neither compensated nor provided alternatives for those whose livelihood depended on hunting.

To check the situation, governments should compensate the affected hunters and, for a long-term sustainable solution, provide them training in alternative trades such as fishery, farming, shoe making, etc. Some people also poach because the land they inhabited was encroached by the government, taken from them, and given to the animals; hence, they poach for rebellion, to show that they are not willing and ready to give up their land. “The park has encroached on our farmland. Because of this, we cannot farm as we ought to. Why then should we not hunt in the forest?” (Mmahi and Usman, 2019, p. 1516). But what most people do not

know is that the land which was taken from them and given to the animals once belonged to the animals. According to Achara et. al. (2020),

rhinoceros and other tropical Asian fauna once occupied vast intact forests along the entire southern border with India, and into the southern-most low hills and inner valleys of the Himalayas. The area went through a rapid transformation with an influx of immigrants beginning in the 1950s due to malaria eradication, infrastructure development and government-sponsored r settlement programs. (p. 1453)

This obviously led to a decrease in animal population due to a sudden displacement from their habitat.

Poaching can be mitigated by the spatial analysis of the poachers. Spatial analysis is the process of using formal techniques like geographical properties in order to study the behaviors of the poachers. This information can be relevant to governments and can give them an edge when searching for the poachers. According to Haines et al (2012), law enforcement agencies typically use spatial analyses to identify the pattern for crimes such as robberies, arson, etc. (p. 685). A key feature of this analysis is that it is generally used to identify which days and times these crimes occur, and despite how it sounds, spatial analysis is cost effective. It is not expensive to conduct; rather, it saves money. It involves the use of charts, maps texts, etc., that is presented and shared. It mainly involves visual representation. Although it may be time consuming, the results will certainly help governments in the course of finding the poachers.

Poaching does not only lead to extinction, but it can also affect the genetic variability of animals by affecting reproduction capabilities of the animals, causing a rise in reproductive skew; it also affects the social relationship of these animals, which can lead to increased stress hormones, weaker bonds among core and bond groups, etc. And as we seek to curb poaching

practices, spatial analysis should be adopted in order to have an edge over the poachers. So governments, and people who wield similar positions, should begin to take certain steps and measures to protect these animals. They are not just forms of treasures or trophies, they are part of life itself. They are living breathing things and as such have the right to live.

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